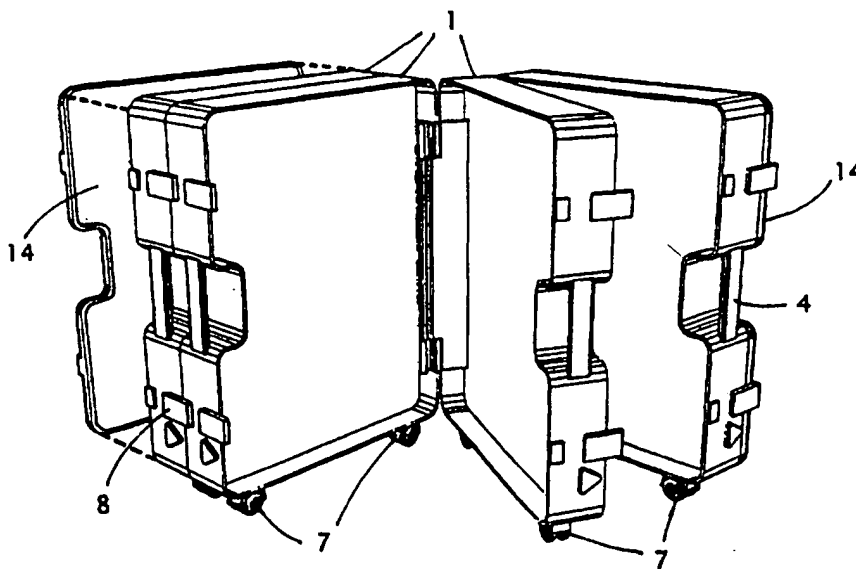




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(54) Title: MODULAR STORAGE AND TRANSPORTATION SYSTEM OF TOOLS AND MATERIALS



(57) Abstract

The invention concerns a device for storage and transport of tools and materials, consisting of modules (1). The separate modules (1) can be hung on the wall (10), pivoting, by means of wall mounted brackets (9). Any number of modules (1) can be coupled in random sequence in such a way that the modules (1) can pivot with respect to each other, and that a book-like unit is created. The system is extendable so that the capacity can be adapted to the quantity of tools or materials. The modules (1) can be closed by means of covers (14), so that a closed unit is created. Every module (1) has a handle (4), so that the assembled unit can be carried with one hand. A unit, consisting of a number of modules (1), can be used as a standing book, whereas the content of each module (1) is easily accessible from both sides. Tools (16) can be fixed in the modules (1) by means of a clamping system in which the tools are clamped axially by spring action between two shoes (22).

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MODULAR STORAGE AND TRANSPORTATION SYSTEM OF TOOLS AND MATERIALS

The invention concerns a device for storage and transport of tools and materials, consisting of modules, as described in the first part of

5 Claim no. 1.

Many systems for storage and transport of tools are known. There are metal toolboxes that can be characterised by a limited overview of the content and a high weight. There are plastic toolboxes with a division in compartments and trays that characteristically have a limited
10 overview and a limited capacity. Finally there are toolboxes in which the tools are not stored in trays, but are fixed onto boards in an organised way, often by means of sleeve pockets, clamps or straps. These boxes have a limited capacity and are not easy to use for heavy tools, because the boards are then difficult to move over or because the the
15 box will then overturn or fall shut. There also exist extendable, modular systems, as described in patents DE-A 42.28.370, DE-U 92.055.444 and DE-U 93.16.16.766. As opposed to the present invention, the content of the modules of the abovementioned systems is accesible only after the modules have been disconnected. The modularity or extendability is
20 exclusively aimed at transportation and not at utilisation. Other patents regarding toolboxes concern a number of modules that can rotate or pivot with respect to each other, as in the patents US-A 5.259.502, DE-U 91.02.718, CH-A 447.075, US-A 4.998.616, WO 90/08631 and EP 0.319.969, but these patents do not include the possibility to easily
25 couple any number of modules that can pivot with respect to each other, nor do they include the possibility to mount the modules separately to the wall, in such a way that they can swung around.

Another modular system is known according to patent EP-A 0556.938. This system has great limitations for the user. Coupling and uncoupling of
30 the modules is done by using a loose shaft, so that one cannot speak of an easy (un)coupling of the modules. A unit, composed of modules, is meant to be used laying flat. If the modules on top contain heavy tools or materials, this leads to backward topping over of the unit.

In addition, these heavy modules must be lifted every time the content
35 of the modules underneath must be reached.

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Besides the abovementioned types of boxes, boards and cupboards are used for the storage of tools. These are boards or cupboards with perforated planes, on which toolclamps can be fixed. The tools are fixed in a well-organised manner, but they use a large wall surface area and are not ready for transport.

- 5 A do-it-yourselfer, a carpenter or a mechanic who uses his tools at home respectively in his workshop as well as elsewhere, wants a storage system for his tools that is well organised and has sufficient capacity, so that he can store all his tools in it and can find each tool easily.
- 10 A user with few tools does not need much storage capacity, and wants a compact, but extendable, system. Someone who works at home or in a workshop, and also goes out to do jobs elsewhere, wants a storage system for his tools that remains well-organised in all situations. He wants to fix his tools to the wall above his workbench at home so that his
- 15 doesn't have to bend down during work. Going to a job, he only wants to take the tools he needs, because he doesn't like to carry too many tools in view of the generally high weight. At the jobsite, he wants a compact and well-organised unit, in which he can find his tools easily without going through trays full of tools. When the job is done, he wants to
- 20 store his tools at home directly, without having to fix each tool separately.

The invention is aimed at providing a system for storage and transportation of tools and materials that is compact, well-organised and accessible under all circumstances, and the capacity of which can easily be adapted.

25 According to the invention, this is achieved by the possibility to couple modules in such a way that they can pivot with respect to each other, while at the other hand they can be hung on the wall separately, whereas each module has a plane on which tools or materials can be fixed

30 from both sides.

According to another aspect of the invention, described in Claim no. 2, coupling of the modules can be done in a user-friendly manner, so that it is possible to assemble a compact mobile unit, containing the right tools for a certain job, easily and quickly.

At the bottom edge, perpendicular to the backside edge that contains the pivot mechanism, each module may be equipped with small castors or elements of comparable function, so that when a number of modules is assembled to form a unit, the unit is moveable as a cart. When the unit is used as a standing book, the castor wheels allow easy movement of the modules with respect to each other, so that each module is easily accessible from both sides. A unit, consisting of one or more modules, can be closed by means of covers to protect the content from environmental influences and from damage. Each module can be equipped with a handle in such a way, that an assembled unit can be carried with one hand. After completion of a job, using a unit assembled of a number of modules, the user can disassemble the unit at home or in the workshop easily, and hang the modules on the wall separately besides each other. Because of the two-sided use of the modules, a large number of tools can be stored on a relatively small wall surface, maintaining overview and accessibility. The tools can be fixed to the plane of the modules by means of suitable clamps or, more specifically, by means of a clamping system that holds each tool between two concave shoes or holders while clamping it axially through spring action.

The invention will be explained in more detail using a number of design examples.

Fig.1 shows a design of a module with a centrally positioned main surface, also called plane, a handle, two castors, closures and a pivot that can be coupled.

Fig.2 shows the other side of the module, with the counterpart of the connectable pivot.

Fig.3 shows two modules, hung on the wall in a pivotable way by means of a module-holder.

Fig.4 shows a top view of the modules on the wall.

Fig.5 shows a number of modules, coupled to form a unit for mobile use, equipped with covers.

Fig.6 shows a section of the pivot in detail; the coupling of the modules.

Fig.7 shows a detail of the pivot in section; the modules are coupled.

Fig.8 shows the axial clamping system for tools or materials, consisting of a top holder and a lower holder.

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Fig.9 shows the top holder with snap fingers, spring and concave shoe. Fig.10 shows the lower holder with height adjustment and concave shoe. In Figures 1 and 2 a possible version of module 1 is shown that is the basis of the system. The module is a case-like product consisting of an edge 2 containing a perforated plane 3 positioned centrally in the module, so that tools can be fixed on both sides of it. The module is rectangular with two long sides and two short sides. One long side has a handle and on the opposite side is the pivot joint that consists of two shafts 5 and two times a casing 6.

10 The casing 6 is a part of the edge of the module. The lower side of the module is equipped with castors 7. Besides handle 4, two closures 8 are mounted. When hanging the modules on the wall in such a way that they can pivot, as shown in Figures 3 and 4, pivot-shaft 5 is used. The shafts are engaged in a module holder 9, that is fixed to the wall 10.

15 The module holder 9 has two conical holes 11 and 12, whereas 12 is less deep than 11. The module holder can be fixed to the wall by means of a wall plate 13. The modules are now hung on the wall in such a way that they can pivot, and tools or materials can be fixed to them from both sides. Handle 4 can now be used to turn the modules and to remove the modules from the wall. Figures 5, 6 and 7 refer to the mobile status of the system. In Fig.5, the modules 1 are coupled through the pivots. A unit is created that can be carried like a case. The outer modules can be closed by means of covers 14. The coupled modules can be locked to each other by means of closures 8 that are mounted on each module.

20 Because castors 7 are under each module, the unit is can be rolled along. Fig.6 shows a side view of how the modules are coupled. One module is put on the ground with the handle on top. The next module is held beside it and the pivot shafts 5 are positioned in the pivot casings 6, after which two sprung cams 15 take care of the coupling. The cam 15 turns away when the pivot shaft 5 is inserted into the casing 6. After shaft 5 has reached its end position, cam 15 returns to its initial position by means of a spring. The pivoting connection is now secured. The disengagement of the pivot is realised by letting cam 15 turn away through a mechanism, activated by button 32. Figures 8, 9 and

35 10 refer to the axial clamping system. The tools 16 are held in a tool clamp consisting of two holders 17 and 18.

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The tool holders are fixed to the perforated plane 3 by means of snap fingers. Figure 9 shows the top holder 17. Figure 10 shows the lower holder 18. The top holder consists of a concave shoe 22 that is connected through a straight guidance to a guiding block 19 by means of calliper 5 23. The guiding block 19 is fixed to the perforated surface 3 by means of two snap fingers 20 and 21. The guiding block 19 can be moved up and down with respect to calliper 23. Two springs 24 deliver the spring force for the system. The lower holder 18 consists of a shoe 30, comparable to 22 to the extent that this shoe 30 is bevelled at the 10 front side. In the shoe 30, two shafts 28 and 29 are mounted, that take care of a straight guidance in guiding block 25. Just as guiding block 19, the guiding block 25 can be fixed to plane 3 by means of snap fingers 26 and 28. The lower holder 18 has no springs, but is adjustable in height by means of adjusting bolt 31, so that the above described 15 clamping of the tools can also be applied otherwise.

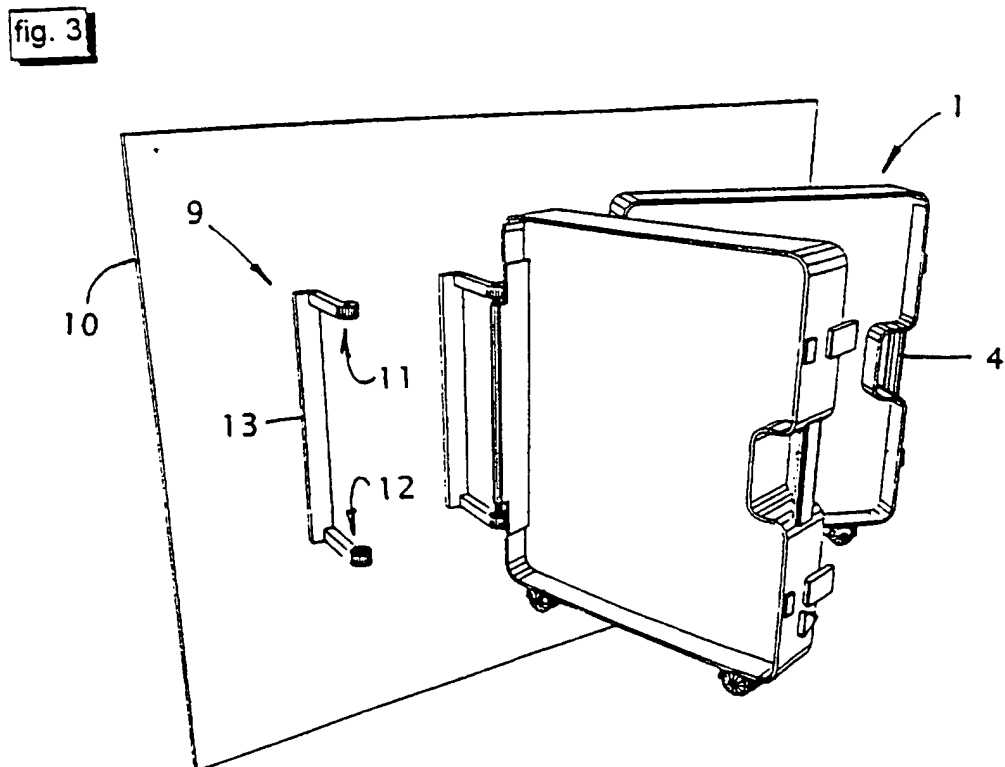
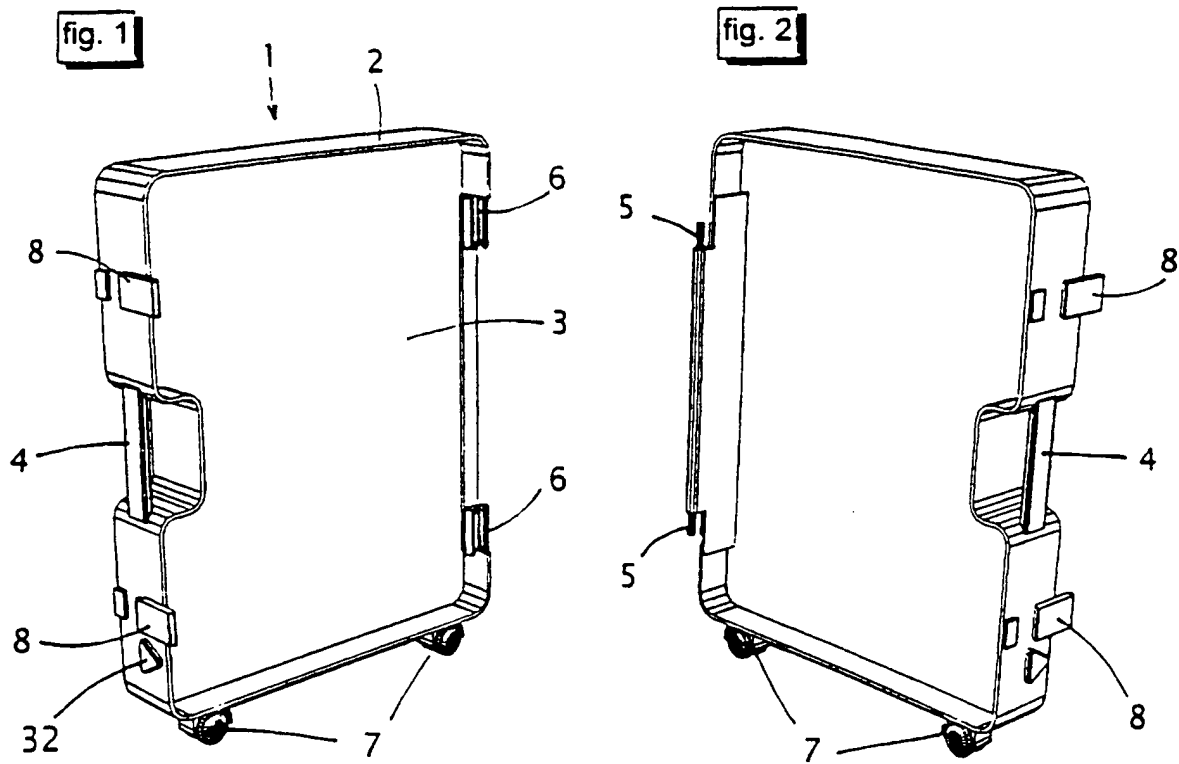
Claims

1. A device for storage and transportation of tools and materials, consisting of modules that can be coupled in any sequence, whereas the coupling is such that the modules can pivot with respect to each other, with the characteristic that every module is provided with means to hang the separate module, pivotable around a vertical axis, on a wall-mounted holder and is also provided with a plane (3) on which tools or materials can be fixed on both sides.
2. A device, in particular according to Claim 1, with the characteristic that the pivoting coupling between the modules is achieved by inserting the pivot shafts (5) of one module in the pivot casings (6) of the other module, these pivot casings being provided with a cam that can be turned or moved away, preferably spring loaded, and that, by returning in its rest position, locks the pivot shaft when it is fully inserted in the pivot casing (6).
3. A device, in particular according one of the Claims 1 or 2, with the characteristic that on the lower side, that is perpendicular to the pivot side, every module is provided with castors or devices with a comparable function.
4. A device according to one of the above Claims 2-3 incl. with the characteristic that every module is provided with means that make it possible to hang the separate module, pivoting on a vertical axis, on a wall-mounted holder.
5. A device according to one of the above Claims 2-4 incl. with the characteristic that every module is provided with a plane (3) on both sides of which tools or materials can be fixed.

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6. A device according to Claim 1 or to one of the above Claims 3-5 incl. with the characteristic that pivoting coupling of the modules is achieved by inserting the pivoting shafts (5) of one module in the pivot casings (6) of the other module, these pivot casings being provided with a cam that can be turned or moved away, preferably spring loaded, and that, by returning in its rest position, locks the pivot shaft when it is fully inserted in the pivot casing (6).
7. A device according to one of the Claims 1-2 incl. or 4-6 incl. with the characteristic that on the lower side, that is perpendicular to the pivot side, every module is provided with castors or devices with a comparable function.
8. A device, according to one of the above claims, with the characteristic that the number of modules that can be coupled in the way as described in Claim 1, is, in principle, unlimited.
9. A device according to one of the above claims, with the characteristic that the pivoting of coupled modules with respect to each other can be blocked by means of closures, mounted on the modules.
10. A device according to one of the above claims, with the characteristic that, when hanging the module, pivoting, on a wall mounted holder, the pivot shafts (5) of the module are utilised.
11. A device according to one of the above claims, with the characteristic that disengagement of the pivoting coupling between two modules is achieved by letting the cams (15) of one module turn or move away through a single-handedly operated transmission mechanism.
12. A device according to one of the above claims, with the characteristic that every module is provided with means to attach a carrying belt or shoulder belt to it.

13. A device according to one of the above claims, with the characteristic that above mentioned plane (3) is provided with a large number of holes in a regular pattern, in which clamps or holders for tools or materials can be fixed.
- 5 14. A device according to one of the above claims, with the characteristic that above mentioned clamps or holders can be fixed in the appropriate holes of plane (3) by means of snap fingers that are mounted on, or are part of, these clamps or holders.
- 10 15. A device according to one of the above claims, with the characteristic that the modules are made of plastic by means of an injection moulding process.
- 15 16. A device according to one of the above claims, with the characteristic that the tools or the materials that are stored therein, can be fixed by means of clamping devices, each consisting of two holders (17) and (18) between which the tool or material is clamped through an axial clamping between the concave shoes (22) and (23) that, spring loaded or not, can move axially with respect to each other.
- 20 17. A device according to one of the above claims, with the characteristic that the above described clamping devices for tools or materials are made in such a way, that one concave shoe (22) is movable against spring action, and the other concave shoe (30) is not spring loaded, and can be fixed with respect to the other
- 25 concave shoe (22) by means of one or more adjusting screws.



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fig. 4

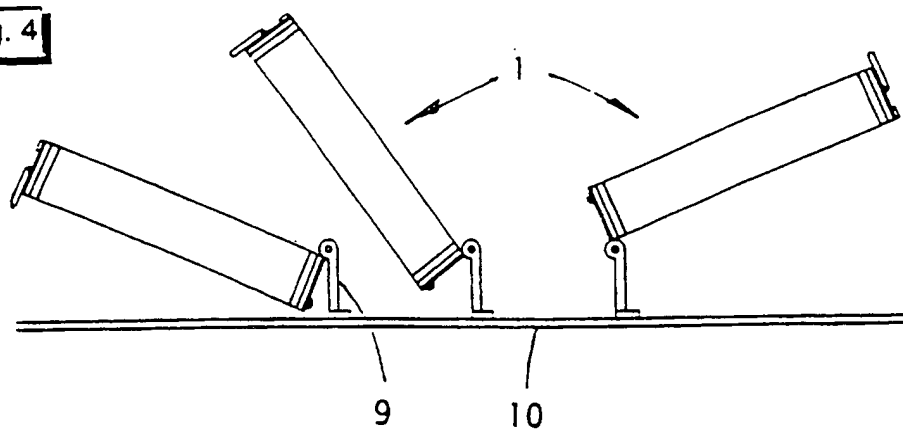


fig. 5

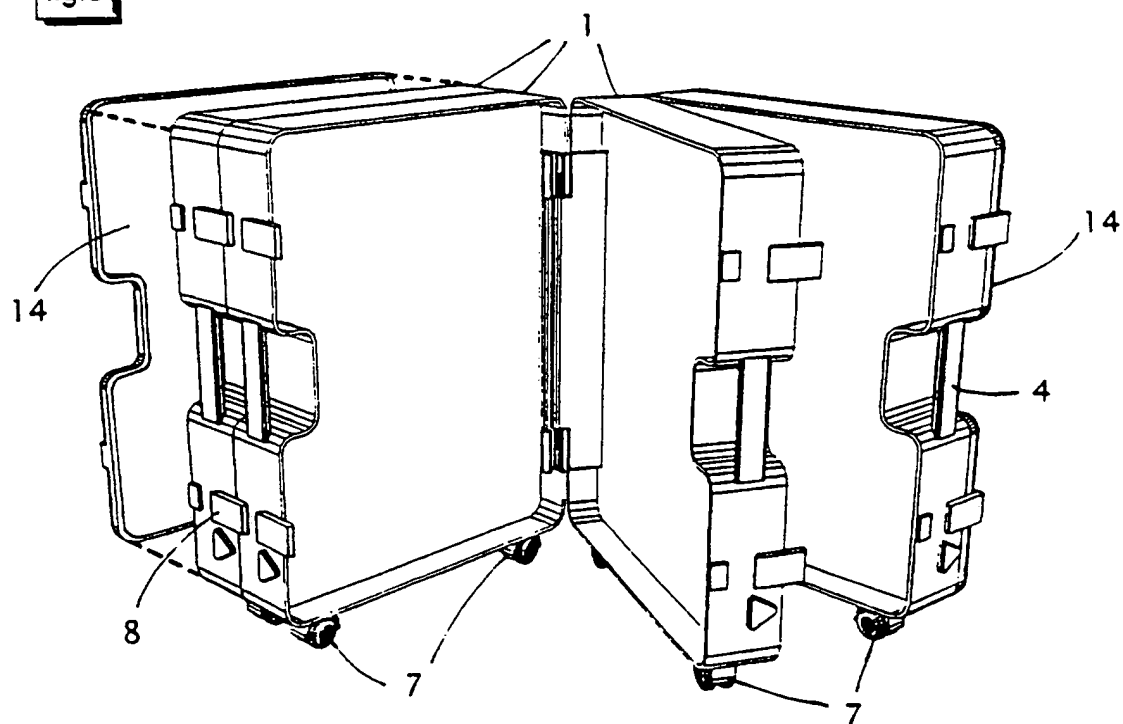


fig. 6

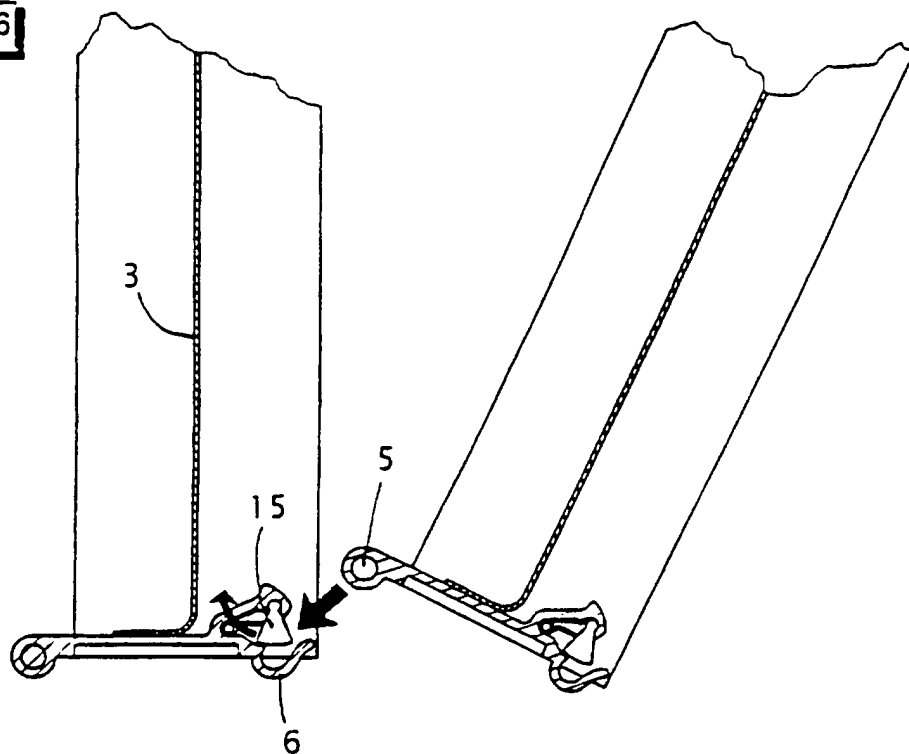


fig. 7

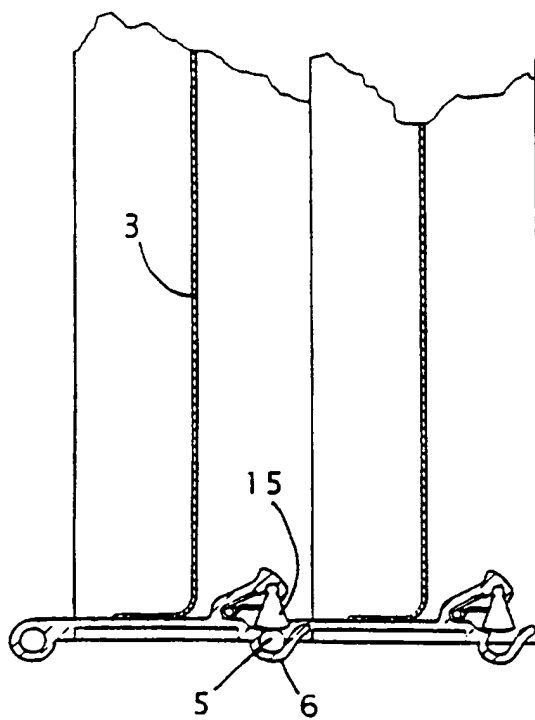


fig. 8

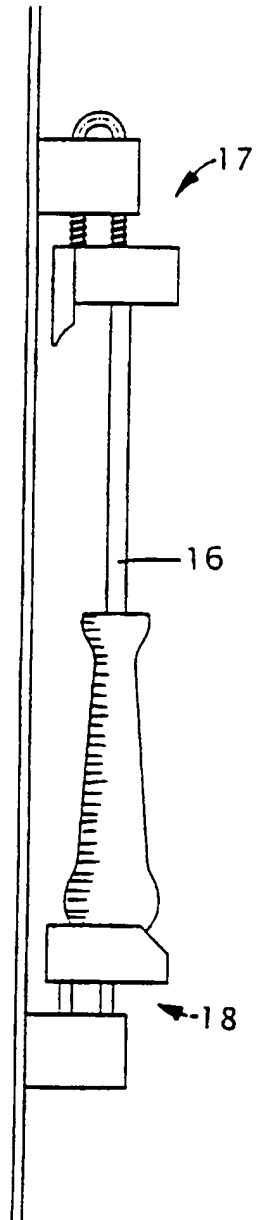


fig. 9

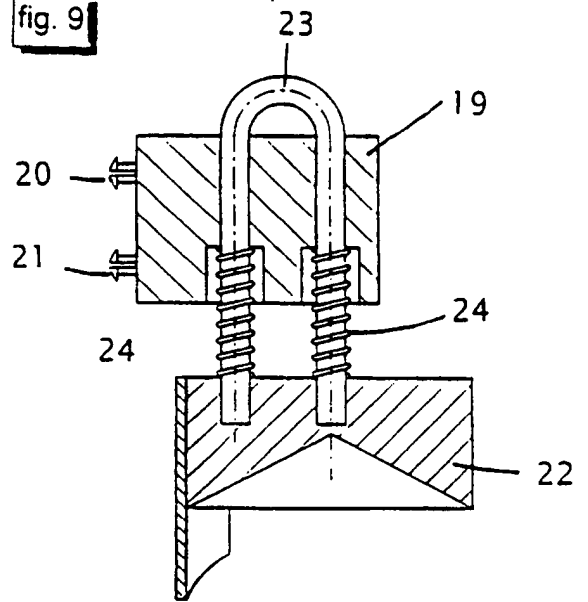
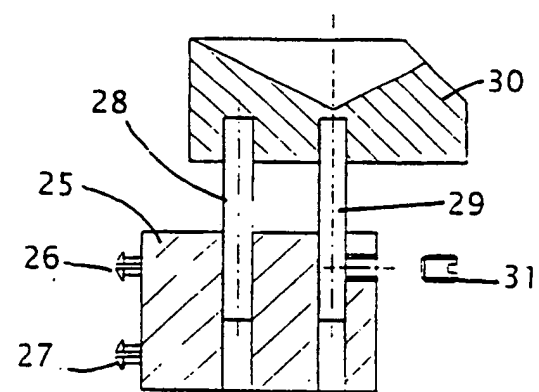


fig. 10



INTERNATIONAL SEARCH REPORT

International Application No
PCT/NL 97/00048

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 B25H3/02 E05D7/10 B65D25/22

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B25H E05D B65D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 0 566 983 A (LISTA KUNSTSTOFFTECHNIK AG) 27 October 1993 see column 8, line 1-21 see column 12, line 3-51 see column 15, last paragraph; claim 1; figures 1,5,6 ---	1,8,9
Y A	US 4 971 234 A (HAY) 20 November 1990 see abstract ---	1,8,9 4
A	WO 90 08631 A (SNEADER) 9 August 1990 cited in the application see page 2, line 1-6; figures 1,5,6 ---	1,5
A	US 5 217 115 A (PURKAPILE) 8 June 1993 see the whole document ---	1
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☒ Further documents are listed in the continuation of box C.

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Date of the actual completion of the international search

29 May 1997

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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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